BUREAU OF WATER

South Carolina Department of Health and Environmental Control

South Carolina

Beach Monitoring Program

Quality Assurance Project Plan

Revised

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PROMOTE PROTECT PROSPER

South Carolina Beach Monitoring Program

Quality Assurance Project Plan

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United States Environmental Protection Agency

Atlanta, Georgia

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South Carolina Department of Health and Environmental Control

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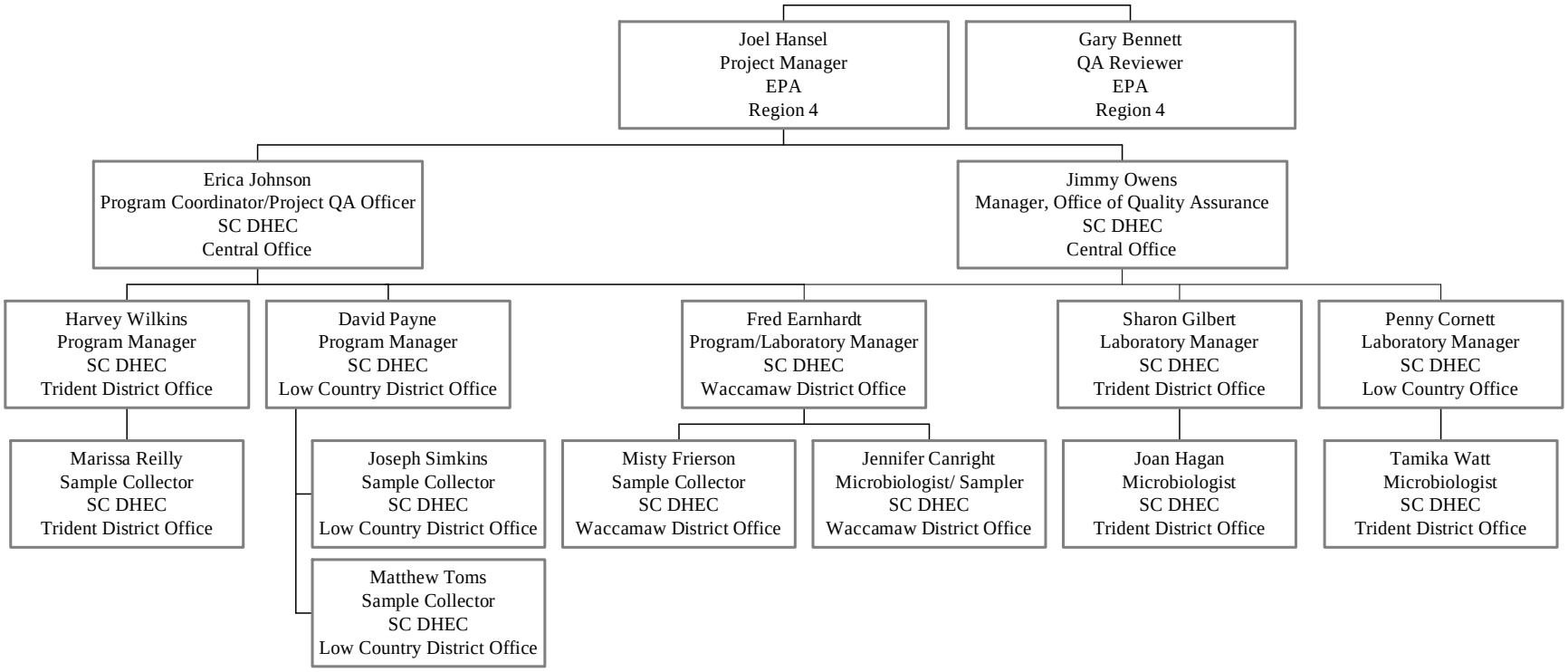
Project Organization



The responsibilities of participants are as follows:

Manager of Office of Quality Assurance

The Manager of Office of Quality Assurance is responsible for the oversight of all quality assurance activities associated with DHEC sampling and analysis SOPs. The QA Manager reports directly to upper management. The QA Manager will resolve any issues when corrective actions are needed to address data quality issues involving DHEC staff and SOPs.

Program Coordinator/Project QA Manager

The Program Coordinator/Project QA Manager is responsible for oversight of the South Carolina Beach Monitoring Program. This includes ensuring consistency between district offices and resolving any discrepancies in the sampling and notification programs. The Program Coordinator is also responsible for overall data management and reporting to EPA. The Program Coordinator reports directly to upper management.

Program Manager (District Offices)

Each Program Manager is responsible for local oversight of the monitoring and notification program. Program Managers interpret collected data to determine advisory status. Program Managers report to district office upper management.

Laboratory Manager (District Offices)

Each Laboratory Manager is responsible for overseeing day-to-day operations of the district laboratory and assuring compliance with applicable Quality Control procedures. Laboratory Managers report directly to upper management.

Microbiologist

Microbiologists are responsible for analysis of samples and documentation of results following all applicable standard operating procedures. Microbiologists are also responsible for general

laboratory maintenance to include instrument calibration. Microbiologists report the district laboratory manager.

Sample Collector

Sample Collectors are responsible for proper collection and transport of water samples following all applicable standard operating procedures. Sample collectors report to the district program manager.

Phase 1 – Planning

Section A – Project Management

A5 Problem Definition/Background

During the summer of 1996 there was increased interest by the Department of Health and Environmental Control (DHEC) in the water quality of South Carolina's ocean beaches, especially in the Grand Strand area. A report by the Natural Resources Defense Council and articles in local newspapers sparked criticism because South Carolina did not have a program in place to monitor our ocean water quality and advise swimmers appropriately.

In response to this interest DHEC, in conjunction with several local governments, conducted a study in 1997 to determine levels of bacteria in the ocean water of South Carolina beaches under varying site and environmental conditions. DHEC used this data and experience to develop a model sampling plan. However, due to the logistics of sampling, holding times for samples, laboratory space, and funding, DHEC could not carry out the model plan.

In 1998, the South Carolina General Assembly allocated some non-recurring funds to DHEC for ocean water quality monitoring. These funds were used to carry out the sampling plan established by the 1997 study. This monitoring plan has been carried out each year to present.

This document is a plan to implement a federally standardized sampling, analysis, and notification plan. This project builds upon the existing beach monitoring program, fully developing an effective and comprehensive monitoring and public notification program for South Carolina's coastal beaches and complying with the federal BEACH Program requirements.

A6 Project Description and Schedule

DHEC will monitor beach water quality in order to issue beach advisories protective of public health. Bathing beaches and related sampling sites have been determined following EPA guidance (Appendix B) and all sample sites have been recorded with Global Positioning Systems (GPS) units. Advisories will be issued based on enterococci counts as determined by the Enterolert Quanti-Tray method. Additional data, such as rainfall amounts, will be collected for use in developing a predictive model.

Sampling and analysis will be carried out by each coastal Environmental Quality Control District office, Waccamaw (Horry and Georgetown county), Trident (Berkeley, Charleston, and

Dorchester county), and Low Country (Beaufort, Colleton, and Jasper county). Sampling and analysis may also be performed by the municipality in which the beach is located, in conjunction with DHEC. All laboratory analysis will be performed by laboratories certified by DHEC's Office of Laboratory Certification. Each coastal district office is equipped with needed supplies for monitoring and sample analysis. A listing of DHEC lab equipment and supplies utilized for the project are stated in each attached standard operating procedure (SOP). Equipment quality control requirements, maintenance, corrective actions needed, and records of quality control (QC) checks performed are also included in Attachment 3. Routine sampling will be conducted April through October at a frequency determined by beach ranking (Appendix B).

Completed Ocean Water Quality Sampling Data Forms (DHEC 2508, Appendix F) will be sent to the Central Office with a copy retained in the district. Testing results and advisories will be stored in DHEC's Environmental Facility Information System (EFIS). DHEC will make data available on a Network Node for upload or retrieval by EPA (Appendix C).

A7 Data Quality Objectives and Criteria for Measurement Data

Specifying Data Quality Objectives

The purpose of the beach monitoring program is to protect the health of South Carolina's residents and tourists by issuance of advisories based on rapid and accurate measurements of water quality indicators. Advisories will be based on exceedance of enterococci water quality criteria established by EPA in "Ambient Water Quality Criteria for Bacteria-1986." Objectives of the beach water quality monitoring program include:

1. Increasing public awareness of the beach advisory program.
2. Identifying short-term increases in the pathogen indicator, enterococci, for use in issuance of advisories.
3. Identifying trends in bacteriological water quality to aid in development of a predictive model.
4. Continuing documentation of the existing condition of South Carolina's coastal recreational waters.

Identify the Decision

The steps to the decision making process are identified in the attached flow chart (Appendix D). The goal of the decision making process will be to determine if a beach water advisory should be issued. This determination will be based on water quality criteria established by EPA and DHEC. If sample results exceed water quality criteria, personnel will either resample or immediately issue an advisory. This decision is based on the level of enterococci present in the sample ($\geq$104/100mL = resample (Tier 1&2 only); $\geq$500/100mL = advise immediately). If resample levels exceed the action level (104/100mL) an advisory will immediately be issued. DHEC will notify local government officials and the public of all advisories.

Inputs to the Decision

Data collected for the beach monitoring program will include enterococci counts, weather, tidal state, current direction, and previous 24-hour rainfall amount. Enterococci counts will be the determining factor for issuing advisories. The criteria used to evaluate risk will be based on EPA's risk evaluation of 19 illnesses per 1000 swimmers as described in "Ambient Water Quality Criteria-1986."

Boundaries of the Study

The monitoring program's spatial and temporal boundaries are described in the "Sampling Design and Monitoring Implementation Plan" (Appendix B). Beaches are ranked by a three tier system according to potential public health risk (i.e., historical water quality data, presence of pollution sources) and beach use. Practical constraints to the program include limited staffing and limited funding.

Decision Rule

After the collection of marine water samples from bathing beaches using the sample collection protocols described in Section B, each sample will be analyzed for enterococci. The results for enterococci will be reported as a single sample maximum and, where applicable, a geometric mean.

In order to allow time for resampling, routine samples will be collected Monday through Wednesday. If a routine sample exceeds the 104/100 mL action level, a repeat sample must be collected within 24 hours of notification of sample results (Tier 1&2 only). If the repeat sample

also exceeds 104/100mL, an advisory will be issued. If any single routine sample exceeds 500/100mL, an advisory will be immediately issued.

Advisories will be promptly forwarded by the district beach monitoring program manager to each coastal EQC District Office, Central Office personnel, and local government officials, as discussed in the "Overall Notification and Risk Communication Plan" (Appendix E). Media outlets (i.e., newspapers, local television and radio stations, etc.) will be contacted by either the district program manager or the local government, as negotiated. Beach advisories will also be posted on Earth 911's Beach Water Quality website (www.earth911.org). Advisories will be lifted upon confirmation of sample results below the action level (104/100mL for Tier 1&2, 500/100mL for Tier 3).

Collection of weekly samples at Tier 1 beaches will also allow DHEC to calculate a monthly geometric mean for enterococci. The geometric mean will be based on the results of the five most current sample periods, including resamples. Since resampling data will be included in the calculation, the geometric mean may be calculated with a variable number of samples but will maintain the requirement of at least five samples in a 30-day period. The geometric mean action level for enterococci is based on EPA's recommendations and will be 35/100 mL of marine water. Geometric mean based advisories will be issued at the discretion of the district program manager and the program coordinator. Advisories will be lifted upon receipt of sample results that lower geometric mean to < 35/100mL.

Tolerable Limits on Decision Errors

Quality objectives and criteria describe how a sample should be collected and analyzed to ensure that the data are acceptable and usable. False positive and false negative results will be avoided by following the prescribed EPA techniques for sampling and laboratory analysis. Sampling design error occurs when the sampling design cannot capture the extent of variability that exists in the environment and measurement error is associated with bias and imprecision in sampling methodology (sample handling, storage, preservation, and identification). These errors will be avoided by collecting samples that best represent the conditions of each area, and by using trained, professional staff that adhere to the QAPP and the

standard operating procedures (SOPs), and review data entry. Sampling design and SOPs are discussed in Section B.

Specifying Measurement Performance Criteria

Performance criteria (Data Quality Indicators-DQIs) include measures of precision, accuracy, representativeness, completeness, and comparability. Precision and accuracy of samples are determined by laboratory measurements. These factors will be addressed in the laboratory QA manuals certified by DHEC, as required by Regulation 61-81, State Environmental Laboratory Certification Program. The DHEC Environmental Laboratory Certification Program is regulated by EPA's National Environmental Laboratory Accreditation Program and certifies laboratories to follow EPA guidelines (Chapter 64E-1, F.A.C.).

Representativeness is the degree to which data accurately and precisely represent the characteristics of a population. Representativeness will be insured through proper selection of sampling points. Sampling sites have been selected for each 2-3 miles of beach based on beach access points, with additional sites in problem areas. Samples are taken at knee depth (approximately two feet) to best represent the area where recreation normally occurs.

Completeness is the percentage of measurements that are considered valid and are entered into the data management system. A high percentage of completeness will be achieved by controlling sample loss and data entry procedures. To control sample loss, samples will be collected in plastic containers to control breakage. Each sample will be given a unique identification number for tracking and will follow standard chain of custody procedures. Data will be checked for completeness upon entry into the data management system. Any omissions will be brought to the attention of the program coordinator and the applicable district manager.

Data sets are considered comparable when they can be considered equivalent with respect to the measurement of variables. Data sets will be made comparable by uniformly training staff in sample collection and analysis. Collection of samples and analysis of water quality parameters will follow approved methods and standard operating procedures.

A8 Special Training Requirements

The training of new staff will emphasize:

- the importance of following sampling SOPs;

- the theory behind indicator organisms;
- QA/QC protocols;
- how to complete DHEC Form 2508;
- how to use the data management systems;
- and the safety aspects of field sampling.

Current staff may not require additional training to follow the prescribed protocols. New DHEC employees who routinely perform field activities will receive basic training in accordance with the Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (SC DHEC, 2001 Edition). All current DHEC field and laboratory staff are listed in the project organization chart, A.4 or included in the attached QAPP for the contract lab.

A9 Documentation and Records

DHEC Central Office and district offices will retain appropriate documentation. The Ocean Water Quality Sampling Form (DHEC 2508, Appendix F) includes the following parameters.

- Project code and county location
- Sample dates, times, and station number
- Sample collector
- Sample identification numbers
- Weather conditions (clear, fair, cloud, rain)
- Rainfall in previous 24 hours
- Tidal condition (ebb or flood, 1/4, 1/2 or 3/4 ebb or flood)
- Current direction
- Salinity
- Enterolert results
- Chain of Custody
- Comments (may be used by sampler or lab analyst to document any difficulties or unusual circumstances)

Sample analysis will be performed solely by laboratories certified through DHEC's Office of Laboratory Certification. The Enterolert SOPs utilized by DHEC and the contract lab referencing Standard Methods 9223 are included in the attachments. Estimated lab turnaround

time for bacteriological results is 24-28 hours. The District Program Manager is notified immediately of any exceedances to the water quality standard for action as described in the sampling design in Appendix B. Timely enterococci results and notification is critical to the advisory notification program.

Data Reporting Package Format and Documentation Control

The format of all data reporting will be consistent with the requirements and procedures for data validation and data assessment described in Sections B, C, and D. All documents and records will be handled according to the SOP developed by DHEC (Section B).

Data Reporting Package Archiving and Retrieval

All DHEC raw lab data, logbooks, analysis worksheets, analysis QC records, equipment QC records, etc. are maintained in the District Offices for a minimum of three years before being transferred to the Central Lab for archiving no less than twelve years. Data entered into the Environmental Facility Information System (EFIS) will be retained for the life of the system.

Phase 2 – Implementation

Section B – Measurement/Data Acquisition

B1 Sampling Process Design (Experimental Design)

The standard operating procedures (SOPs) for field sampling describe the method by presenting the procedure in sequential steps and including specific facilities, equipment, materials and methods, and QA/QC procedures.

The proper collection, preservation, and storage of beach water samples is necessary to reduce errors in analysis. The sample container will be an empty, sterile, disposable plastic sample container. The sample container shall be at least 125 milliliters (mL) in volume to allow for adequate sampling and good mixing. Sample containers larger than 1,000 mL shall not be used. Field sampling personnel will not open the sample container until just prior to taking the sample in order to protect the container from contamination.

Marine water samples are susceptible to rapid increases or death of microorganisms and hence will be held for the shortest time possible to minimize change. Maximum holding time for bacteriological samples will be six hours. Steps for the preservation and transit of collected water samples will be followed precisely, or the sample will not be analyzed and another sample will be collected. Bacteriological samples must be iced or refrigerated at a temperature of 1-10 degrees Celsius (^{o}C) and stored in insulated containers to assure proper maintenance of storage temperature during transit to the laboratory.

Rationale for the Design

The protocol for sampling is outlined in the Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (SC DHEC, 2001 Edition), based on the grab sample technique.

Design Assumptions

Tier I beaches will be sampled weekly. Additional samples will be taken at Tier 1 beaches for aid in development of a predictive model. Tier 2 beaches will be sampled twice per month. Tier 3 beaches will be sampled once per month, as resources allow. In order to allow time for the resampling, routine samples will be collected Monday through Wednesday. The sampler will document any variations in sample collection site or protocol. Approximately 1,500

to 2,000 samples will be collected and analyzed by DHEC per season, including repeat sampling. Refer to attached Coastal Carolina University (CCU) QAPP for number of samples to be collected and analyzed by CCU.

Procedures for Locating and Selecting Environmental Samples

DHEC has selected sampling sites, as described in the "Sampling Design and Monitoring Implementation Plan" (Appendix B), based on the criteria outlined in the "Risk-Based Beach Evaluation and Classification Plan" (Appendix A). Each site has been recorded with GPS units and mapped.

Parameters to be Measured

Of the parameters listed in A9 that will be measured at each site, the only critical measurement is the Enterolert result. The other parameters are collected primarily for informational purposes only.

B2 Sampling Methods Requirements

Equipment:

The following equipment and supplies will be used in sampling:

1. Disposable sterilized plastic sample bottles, 125 ml minimum capacity
2. Device for collecting sample in heavy surf
3. Polyethylene storage bags (if loose ice is used)
4. Coolers
5. Ice packs or loose ice
6. Permanent ink marking pens
7. Field log sheet, DHEC 2508

Step-by-Step Procedures

Samples are collected in disposable plastic sample bottles according to the following protocol.

1. Carefully check for and discard any sample bottle with cracked lids.
2. Label sample bottles and field log sheet (DHEC 2508, Appendix F) with station numbers of samples to be collected. Use a non-smearing permanent ink marking pen on sample bottles.
3. Identify the sampling site on the bottle label and on a field log sheet (DHEC 2508).

4. Remove the bottle lid just before obtaining each sample and protect bottle and lid from contamination. Be careful not to touch the inside of the bottle itself or the inside of the lid.
5. Wade into the surf or tidal area to a depth of approximately two feet (knee depth). In calm water, the sampler should strive to create as little disturbance of the area as possible. Allow time for sediment settling prior to collecting the sample. In unusually heavy surf, areas of exceptional currents, or dangerous or unknown bottom situations, sampling may be conducted utilizing a reaching device, provided that the device does not allow for sample contamination.
6. Open a sampling bottle and grasp it at the base with one hand and plunge the bottle mouth downward into the water to avoid introducing surface scum. Position the mouth of the bottle into the current away from the hand of the sampler. Samples are taken six to twelve inches below the water's surface. If the waterbody is static, an artificial current can be created by moving the bottle horizontally with the direction of the bottle pointed away from the sampler. Tip the bottle slightly upward to allow air to exit and the bottle to fill.
7. Remove the bottle from the waterbody.
8. Pour out a small portion of the sample to allow an air space of approximately one inch above each sample for proper mixing of the sample before analysis. If present, use the 100 mL indicator line as a guide.
9. Replace bottle lid tightly.
10. Complete the field record portion of DHEC Form 2508 (Appendix F), to include, weather, tide, and current direction.
11. Store samples in a cooler with ice or ice packs while en route to the laboratory, maintaining a temperature of 1-10^{o}C. If loose ice is used, bottles must be enclosed in sterile polyethylene sampling bags to prevent sample contamination. Do not hold samples more than 6 hours between collection and initiation of analysis.

B3 Sample Handling and Custody Requirements

Sample Custody Procedure

Chain of Custody (COC) procedures are to be followed whenever samples are collected, transferred, stored, or analyzed. Samplers will follow the sampling protocol and will directly deliver samples to a certified laboratory for analysis. Laboratory staff will complete remaining portions of DHEC Form 2508 and any COC records required. Laboratory entries to be made include: laboratory sample number, enterococci per 100 milliliters, salinity, date and time received, date and time analyzed, and date and time released. Each data report must be initialed by the laboratory technician who reviewed the data.

The district program manager will be responsible for overseeing any corrective actions involving sampling. If samples are not handled properly, they will not be analyzed and replacement samples will be collected promptly.

B4 Analytical Methods Requirements

All certified laboratories will complete enterococci analysis using the Enterolert Quanti-Tray method as derived from Method 9223A,B of Standard Methods for the Examination of Water and Wastewater, 20th Edition. DHEC laboratories will follow the procedure as outlined in the SC DHEC Laboratory Procedures Manual for Environmental Microbiology (Attachment 3). Estimated lab turnaround time for bacteriological results is 24-28 hours. The District Program Manager is to be notified immediately of any exceedances to the water quality standard. Any problems or corrective actions involving the analytical methods used by the DHEC laboratories will be addressed by the EQC Labs Office of Quality Assurance. The contract (municipal) lab has designated a Laboratory QA Officer to oversee their QA functions and address any concerns (see CCU QAPP attached).

B5 Quality Control Requirements

QC Procedures

Monitoring and laboratory staff will undergo all necessary training requirements. District program managers will train and routinely monitor all DHEC field and laboratory staff for compliance with established protocols. Audits will be periodically conducted by the program coordinator. DHEC's Office of Laboratory Certification will inspect all laboratories for

compliance with standards. Sample handling and custody requirements will be monitored after each sample is collected and during the transfer of the samples to the laboratories. Data will be double-checked upon entry and will be reviewed by the program coordinator. Current QC protocols used by the DHEC laboratories and the municipal contract laboratory are attached.

B6 Instrument/Equipment Testing, Inspection, and Maintenance

All testing, inspection, and maintenance of laboratory equipment will be conducted as prescribed by laboratory QA manuals. Please reference attachments for DHEC and contract laboratory procedures.

B7 Instrument Calibration and Frequency

All laboratory instrument calibration will be conducted as prescribed by laboratory QA manuals. Please reference attachments for DHEC and contract laboratory procedures.

B8 Inspection/Acceptance Requirements for Supplies

Critical Supplies

The necessary supplies for field sampling include sterile polyethylene sampling bags, sterile disposable plastic sample containers with labels, insulated containers for transporting samples, ice packs or loose ice, ocean water quality sampling forms, and sampling SOPs/checklists. The DHEC Program Manager and Laboratory Manager are responsible for ensuring the necessary field and lab supplies are available as needed. The municipal contract lab has designated similar responsibilities in their QAPP.

Inspection Requirements and Procedures

DHEC's Division of Laboratory Services establishes criteria for inspecting and accepting laboratory supplies. Other certified laboratories will establish criteria based on DHEC Laboratory Certification requirements.

B9 Data Acquisition Requirements

Discussed in section A7.

B10 Data Management

Data Recording

The DHEC Lab utilizes a Laboratory Information Management System (LIMS) to verify and store data. Once samples have been collected and analyzed, the results will be entered into

LIMS and subsequently uploaded to the Environmental Facility Information System (EFIS) database. District staff and the beach monitoring coordinator will assess the data for completeness and data entry errors. Any discrepancies will be verified with the hard copy and district staff. The nature of the data and the subsequent analyses will be consistent to permit the comparison of data in one set to others. Hard copies of field and laboratory data will be stored for no less than twelve years. Electronic data will be stored for the life of the system.

Data Validation Checklist

Data will be validated and verified based on an assessment of the following factors:

1. Completeness of the data;
2. Adherence to proper sample preservation, transport, or handling protocols;
3. Proper use of sample collection procedures;
4. Proper use of quality control criteria;
5. Documentation of all data;
6. Ability to reconstruct all field sampling procedures through documentation and records of such procedures;
7. Ability to trace data in the final report to a specific sampling site, date, and time;
8. Appropriateness of the data as related to specific data quality objectives.

Data Analysis

DHEC will analyze water quality parameters and associated environmental conditions (i.e., rainfall) for development of a predictive model.

Phase 3 - Assessment

Section C – Assessment/Oversight

C1 Assessments and Response Actions

Assessment Activities and Project Planning

DHEC will review data for discrepancies and missing information following each sampling period. The status of the project will be evaluated through this surveillance of the records and will ensure that the requirements of the QAPP are being fulfilled. Periodic audits, a minimum of one per season, of field sampling techniques will be conducted by the district program manager and the program coordinator to ensure that protocols are consistent with the QAPP. The DHEC Office of Quality Assurance conducts annual internal assessments of the district laboratories. DHEC's Office of Laboratory Certification will perform contract laboratory assessment activities, such as annual proficiency testing samples, where applicable. There will be continual review of monitoring and notification documentation.

Documentation of Assessments

Surveillance of data quality will be conducted throughout the project. The Office of Laboratory Certification or the Office of Quality Assurance will correct any problems encountered with district or private certified laboratories.

C2 Reports to Management

The frequency, content, and distribution of reports will be submitted as described in Section A9 of the QAPP and in "Reports to EPA" (Appendix C). The responsible organizations are described in Section A4 of this QAPP. QA reports from internal assessments of the district labs are reported directly to management. The DHEC Office of Quality Assurance will work with management to address any significant QA problems identified.

Section D – Data Validation and Usability

D1 Data Review, Validation, and Verification

Sampling Design

The "Sampling Design and Monitoring Implementation Plan" (Appendix B) describes sample site selection and the frequency of sampling.

Sample Collection Procedures

If the sampler is unable to sample according to the protocol (Section B), then the samples will not be analyzed and resampling will occur.

Sample Handling

Certified laboratory staff will routinely check storage containers to ensure that samples are transported and stored under conditions that will not adversely affect the quality of the sample. COC requirements will be conducted as described in Section B3 and in the EQC Environmental Investigations Standard Operating Procedures and Quality Assurance Manual. If samples are not handled properly, they will not be analyzed and replacement samples will be collected promptly.

Analytical Procedures

Certified laboratories have the instrumentation, techniques, and qualified staff to perform the analyses. Laboratory SOPs related to COC, instrumentation, and technique have been developed as part of the EQC SOP Manual, the Laboratory Procedures Manual and Laboratory Certification requirements. Laboratory personnel will follow the Enterolert Quanti-Tray Method for the detection of enterococci based on Standard Method 9223A,B. DHEC laboratory personnel will follow the procedure as outlined in the SC DHEC Laboratory Procedures Manual for Environmental Microbiology based on Standard Method 9223A,B (Attachment 3).

Quality Control

Sampling quality control will be carried out as discussed in Section B5. Laboratory quality control activities will be conducted according to the laboratory's QA manual (Attachment 3 and CCU QAPP).

Calibration

Instrument calibration activities will be performed following the laboratory's QA manual (Attachment 3 and CCU QAPP).

Data Reduction and Processing

A loss of detail in data will be avoided by the review of data entry and by following the laboratory's QA manual for data reduction and processing activities.

D2 Validation and Verification Methods

Laboratory managers in each DHEC laboratory enter, validate, and verify all analytical data released by their labs. Data entered into the LIMS is verified by the Data Management Section of the Central Laboratory. Program managers review and validate sample collection information. Decisions on rejection of data would be based on assessment of data validation criteria as outlined in section B10. A joint decision between the beach monitoring coordinator, district program manager, and lab manager would resolve any data use issues.

D3 Reconciliation with Data Quality Objectives

This program is designed to support intended use of results through the collection of water quality data. DHEC will analyze data for correlations between environmental factors and water quality results to develop a predictive model.

References

USEPA, 1986. Ambient Water Quality Criteria for Bacteria-1986. U.S. Environmental Protection Agency. EPA-440/5-84-002.

SC DHEC EQC Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, 2001 Edition, Revised 2003.

SC DHEC Laboratory Procedures Manual for Environmental Microbiology, Analytical Services Division, Office of EQC, Bureau of Environmental Services, January 1, 1998, Revised 2001.

APPENDIX A

Risk-Based Beach Evaluation and Classification Plan

The goal of this process is to identify coastal recreation waters, including waters adjacent to beaches or similar points of access that are used by the public and to rank these beaches based on beach use and the potential risk to human health presented by pathogens. This ranking system will be used to prioritize monitoring efforts under the Beaches Environmental Assessment and Coastal Health (BEACH) Act.

Step 1. Identify Coastal Recreation Waters

The BEACH Act defines coastal recreation waters as "…marine coastal waters (including coastal estuaries) designated under the Clean Water Act (CWA) section 303 (c) by a state for use for swimming, bathing, surfing, or similar water contact activities…do not include either inland waters or waters upstream of the mouth of a river or stream that has an unimpaired natural connection with the open sea." All tidal saltwaters within South Carolina are classified as suitable for primary and secondary contact recreation. Also, due to the configuration of South Carolina's coastline and extensive estuarine system, it is difficult to appropriately define all waters that meet the BEACH Act definition. Therefore, coastal recreational waters for the BEACH program have been determined as all waters seaward of the Coastal Critical Line, as defined in the South Carolina Code of Regulations, Chapter 30-10. This line was determined through the use of biological field surveys and aerial photography and is based on vegetation changes (from predominately brackish to predominately fresh) at the uppermost point of estuarine systems. An approximate description of this boundary is as follows: On the south at the intersection of the South Carolina-Georgia border and the old track bed of the Seaboard Coastline (SCL), approximately 1.75 miles above the U.S. Highway 17-A bridge across the Savannah River; thence, northeastward along the track bed until its intersection with S. C. 462 near Euhaw Creek; thence, northward along S. C. 462 until its intersection with U.S. Highway 17/U.S. Interstate 95 near Coosawhatchie; thence, northeastward along U.S. 17/U.S. Interstate 95 until U.S. Highway 17 and U.S. Interstate 95 intersect at Point South, thence, northeastward along U.S. 17 until its intersection with S-15-26, approximately two miles east of Green Pond; thence, southward along S-15-26 (Bennetts Point Road) until its intersection with the old SCL

track bed near Airy Hall; thence, east-northeastward along the track bed on its intersection with S. C. 174; thence, northward along S. C. 174 for approximately 1.5 miles until its intersection with S. C. 164; thence, east-northeastward approximately three miles along S. C. 164 until its intersection with S. C. 165; thence, northward along S. C. 165 (Bacons Bridge Road) until its intersection with S. C. 642 (Dorchester Road); thence, southeastward along S. C. 642 until its intersection with U.S. Interstate 26; thence, southward along I-26 until its intersection with S. C. 7 (Cosgrove Avenue); thence, northeastward on S. C. 7 until its intersection with the SCL track bed adjacent to S-10-32 (Spruill Avenue); thence, northward along this track bed until its intersection with the Charleston County/Berkeley County line, approximately one-fifth mile north of S-10-13 (Remount Road); thence, east-northeastward along the county line until its intersection with the Cooper River at Goose Creek; thence, eastward by a straight line across the Cooper River and mouth of Yellow House Creek to Jessen Road at the Cainhoy Industrial Park, thence southeastward until its intersection with (Clements Ferry Road); thence, northeastward along S-8-33 until its intersection with S-8-100 (Resurrection Road) until its intersection with S. C. 41, thence northeastward on S-8-100 (Halfway Creek Road); thence, northeastward along S-8-100 until its intersection with S-10-98 (Guerins Creek Bridge Road); thence, southward along S-10-98 until its intersection with U.S. Highway 17; thence, northeastward along U.S. Highway 17 until its intersection with S-27-30 north of the North Santee River; thence, eastward along S-27-30 for approximately five miles; thence, northward along S-27-30 until its intersection with S-27-18; thence, northwestward along S-27-18 until its intersection with U.S. Highway 17 south of Georgetown, thence northeastward along U.S. Highway 17 (Frasier Street) through Georgetown, thence northeastward along U. S. Highway 17 until the intersection of U.S. Highway 17 Business and U.S. Highway 17 Bypass south of Murrells Inlet; thence, northeastward along U.S. Highway 17 Business (Kings Highway) through Murrells Inlet, Garden City, Surfside Beach, and Myrtle Beach until its intersection U.S. Highway 17 north of Myrtle Beach; thence northeastward along U.S. Highway 17 until its intersection with the South Carolina-North Carolina border. In determining the exact location of this boundary, only those lands seaward of the right-of-way line located on the upstream side of road beds and track beds

described shall be included in the tidelands and coastal waters critical areas. The coastal critical line is indicated by the heavy black line on the enclosed maps.

Step 2. Identify Bathing Beaches and Similar Points of Access

Bathing beaches and public access points adjacent to coastal recreation waters were identified using several resources. Traditional beaches, such as those on the Atlantic Ocean shoreline and barrier islands were determined using previous beach monitoring information, maps of the coastal area, and literature from DHEC's Office of Coastal Resource Management (OCRM). Inland beach areas, such as those in bays and estuaries were based on previous beach monitoring sites and lists generated by the Environmental Quality Control office staff in each coastal district.

Other points of access within the coastal recreational waters were determined using GIS coverage of OCRM's records of critical area permitting from 1980 - 1988 and 1992 – 2002 (1989-1991 locational data was not available). All community boat docks, public jet ski ramps, public boat ramps, and public piers within the critical area are included as points of access. All marinas within the critical area are also included as public access points. A list of bathing beaches and similar points of access are included as Attachment 1. Maps of these sites are also included.

Step 3. Review Available Information

In order to establish ranking of identified beaches and points of public access, DHEC reviewed available information concerning intensity of beach use, potential risk to public health, and other applicable factors.

Intensity of Beach Use

Intensity of beach use was based on accessibility of the beach, available governmental data, and observations of actual use. Accessibility encompassed factors such as public or private beach, number of access points, amount of available parking, and if accessible by foot or by boat only. Information concerning access was gathered from the South Carolina Department of Natural Resources and SC DHEC's Department of Ocean and Coastal Resource Management. Coastal governments' tourism and chamber of commerce websites were accessed for additional information concerning use. The 2000 Census and the South Carolina Statistical Abstract 2001-2002 (SC Budget and Control Board) were also examined for data concerning each coastal

county. Input concerning actual use was gathered from sample collectors, district program managers, and shellfish sanitation managers and patrolmen. Input was also gathered from government staff and the public at informational meetings held in each coastal district (Appendix G).

Potential Risk to Public Health

For those beaches previously monitored, risk was assessed based on the presence of known pollution sources and the number of advisories and total beach-mile-days of advisories in the 2002 swim season. For those beaches and points of access not previously monitored, risk was inferred based on several factors. These factors included water body classification, potential for point and non-point source pollution, historic water quality of similar areas, type of use (likelihood of ingesting water), and susceptibility of user population.

Other Factors

Other factors considered in establishing beach priorities were the importance to the local economy and tourism industry, public opinion, and public input. South Carolina's Atlantic Ocean coastline is a well-known feature of the State drawing millions of visitors annually and boosting local economy. Protecting public health through monitoring of this area is a public expectation as can be seen through the abundance of news articles and environmental group publications. Due to these factors, oceanfront beaches are given priority in the ranking scheme.

Step 4. Rank Beaches

The risk-based beach evaluation and classification process culminates in the ranking of bathing beaches to be monitored under the BEACH program. This ranking is based on the potential health risk, usage, and other factors previously discussed. Input on ranking was also gathered at public meetings held in each coastal district. A three tier system was used for this process, with Tier 1 being the highest priority. Tier rankings for each beach are given in Attachment 1.

APPENDIX B

Sampling Design and Monitoring Implementation Plan

The objective of South Carolina's beach monitoring program is to protect public health through the issuance of advisories based on accurate, representative sampling. This sampling design and monitoring implementation plan has been developed to describe the frequency and location of monitoring and assessment of South Carolina's coastal recreation waters.

A study to determine levels of bacteria in the surf of South Carolina beaches under varying site and environmental conditions was conducted with ten local governments in 1997. One sampling site was selected for each two to three miles of beach, and one each at the furthest reaches of accessible beach within each participant's jurisdiction. In areas with swashes or storm water discharges to the beach, sites at their confluence with the ocean, and 100 feet on either side, were selected. At a minimum, the two sites with the highest estimated storm flows in each municipality or jurisdiction were included. Samples were collected in dry weather at high and low tide and in wet weather at high and low tide. "Dry" weather meant that three or more days had passed since the last rain. "Wet" weather samples were collected within three hours of the first rain of 0.1 inches or more, following a dry period. Over 1,400 surf and storm water samples were collected during this study. Major finding of the study were:

- In areas with no storm water outlets or swashes, the geometric mean did not exceed 35/100mL and all individual sample results were less than 104/100mL regardless of weather conditions.
- Beaches with discharges from swashes and/or storm water outlets showed variability based on weather. Dry weather samples from these areas did not exceed the EPA recommended geometric mean (35/100mL). Wet weather effects on surf bacteria varied from site to site and with rainfall amount; results from many samples exceeded the single-sample limit. In general, highest single-sample densities were associated with rainfall amounts greater than one inch.

Routine monitoring of beaches from 1998 through present has validated the previous points and has added to our understanding of beachfront water quality dynamics. This monitoring has shown that beaches with associated storm water runoff (Tier 1 beaches) have the highest counts in the period three hours before to three hours following ebb tides. Based on the

1997 study and on subsequent routine monitoring efforts, the following monitoring plan has been developed.

Sampling Design

		Tier 1	Tier 2	Tier 3
A. When to Conduct Basic Sampling		April 15 - October 15 Once per week Three hours before to three hours after low tide	April 15 - October 15 Twice per month Random tidal stages	April 15 – October 15 Once monthly Random tidal stages
	Rainfall events	May 15 – October 15 Additional samples will be taken following rainfall events for public health protection and to aid in development of a predictive model.	N/A	N/A
	After a water quality standard is exceeded	May 15 – October 15 If any sample exceeds the action level a repeat sample will be taken within 24 hours of result notification.		
	After a sewage spill or pollution event	Sampling will be conducted as soon as possible following a sewage spill or other pollution event. At district manager's discretion, beaches will be preemptively closed until satisfactory sample results are received.		
	Reopening after advisory or closure	Additional samples shall be taken following an advisory until sample results fall below the action level and advisory is lifted.		

Note: Basic sampling begins April 15 of each year. However, due to very limited public water contact, repeat and rainfall sampling will not begin until the official season start, May 15. This design follows EPA's recommendation of beginning sampling one month prior to the season start.

Where to Conduct Sampling

Tier 1 and 2

Samples will be collected at sites selected during previous years' monitoring efforts. Sampling sites are located every two to three miles along the beachfront based on public access

points. Additional sites are located near problem areas such as swashes and storm drain outfalls. Each site has been recorded with global positioning systems (GPS) technology and mapped. Samples are collected at knee depth (approximately two feet) to best represent the area where recreation normally occurs. See Attachment 1 and enclosed maps for sample locations.

Tier 3

Sampling sites at Tier 3 coastal beaches have not yet been determined. Sites will be chosen based on location of access points and observation of areas of public congregation. These sites will be recorded with GPS technology in the future. Sampling sites at other points of public access, such as docks and marinas, will be located at the access point, for example, beside a boat dock. See Attachment 1 and enclosed maps for access point locations. Sample depth will be the same as Tier 1 and 2 beaches.

APPENDIX C

SC DHEC's Reports to EPA

The goal of this product is to describe the mechanism for the South Carolina Department of Health and Environmental Control (DHEC) to collect relevant information and submit timely reports to the United States Environmental Protection Agency (EPA). Most beach monitoring data is collected by DHEC's coastal district offices. Some areas, however, are sampled by the local municipality following DHEC's monitoring plan. Samples are collected and analyzed by the municipality's contract laboratory. Results are relayed to DHEC in a timely manner. All advisories are issued and retracted by DHEC. Advisory signs are posted and removed by DHEC staff or the municipality, as directed by DHEC. All arrangements regarding responsibilities for posting and removal of signs will be negotiated before the start of each swim season.

Municipalities Submittal of Results to SC DHEC

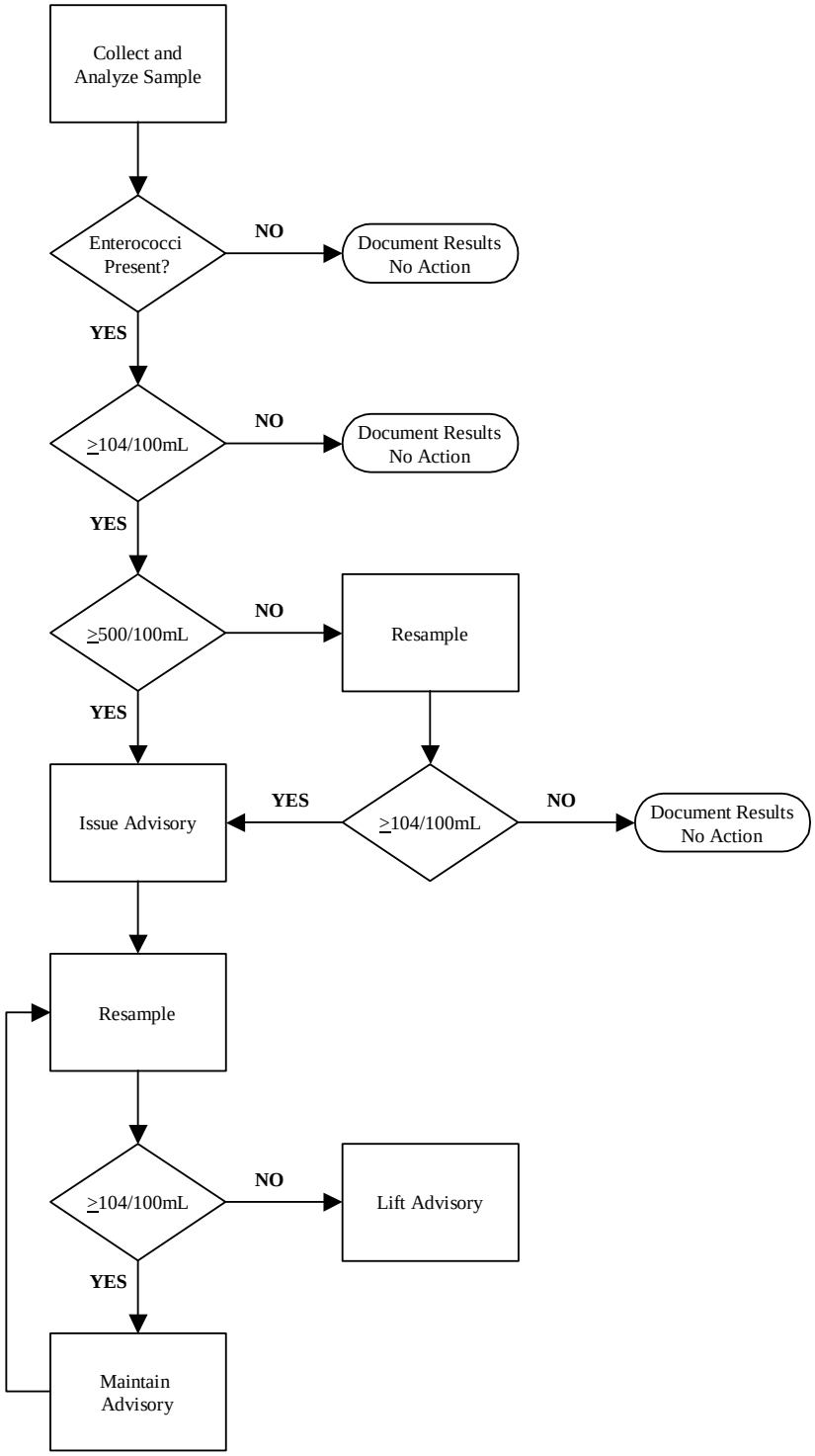
Municipalities will collect data using DHEC Form 2508, Ocean Water Quality Sampling Data Form. Data will be submitted to DHEC following each sampling period in paper copy or approved electronic format. DHEC will be notified immediately by electronic mail or telephone of any results exceeding water quality standards.

SC DHEC Submittal of Results and Advisories to EPA

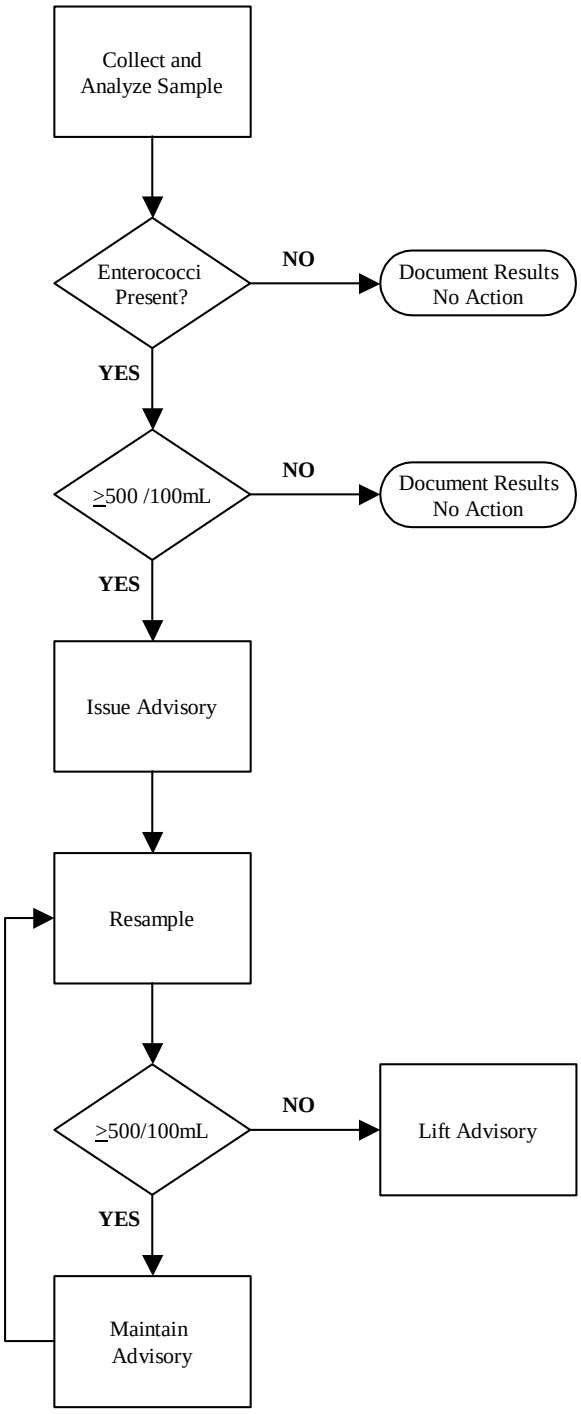
All data for the beach monitoring program will be maintained in DHEC's Environmental Facility Information System (EFIS). EFIS is an Oracle based enterprise-wide, client-server information system. Data entry fields will be designed according to EPA specifications. DHEC will make data meeting the XML schema requirements available on a Network Node for upload or retrieval by EPA. From this data, EPA will be able to annually retrieve all needed information such as; number of times criteria were exceeded, the number of days each beach was under advisory, and the number of beaches for which advisories were issued. DHEC will promptly report advisories to the designated EPA contacts via electronic mail or telephone, as requested.

APPENDIX D

Decision Flow Chart – Tier 1 and 2 Beaches



Decision Flow Chart – Tier 3 Beaches



APPENDIX E

Overall Notification and Risk Communication Plan

This overall public notification and risk communication plan describes the methods that the South Carolina Department of Health and Environmental Control (DHEC) shall employ to communicate to the public when enterococci levels exceed acceptable limits and water contact activities in coastal waters may pose a risk to public health. This plan identifies the measures for prompt communication of such exceedances and identifies how the information will be communicated to EPA, local government officials, and the public.

Problem Assessment and Audience Identification

South Carolina's bathing beaches are important components of the state's tourism industry. DHEC regularly monitors coastal beaches for the bacterial indicator enterococci to assure residents and tourists that the water is safe for water contact activities. The goal of this program is to allow the public to make informed decisions concerning recreating in waters presenting a health risk.

Bacterial indicator results that exceed action limits will require that the responsible party either immediately resample the water body in question to confirm these conditions or issue a beach advisory. When an advisory is issued for a beach, DHEC must disseminate the information to a population that consists of local governments, tourists, and residents. The public is alerted to an advisory or warning through beach sign postings, local press releases, and the Internet. Interested persons may also call the local district office or the central office for listings and updates on advisories.

Types of Advisories and Notification Plan

South Carolina issues two types of advisories: water quality exceedance advisories and preemptive advisories. Permanent precautionary warnings are also issued for specific areas.

Water Quality Exceedance Advisory

If a routine sample at a Tier 1 or 2 beach exceeds 104/100 mL, a repeat sample is collected within 24 hours. If the repeat sample also exceeds 104/100 mL, an advisory is issued. If any single routine sample exceeds 500/100 mL (Tier 1, 2, or 3), an advisory is immediately issued.

Preemptive Advisory

Due to the time required for analyses, it may not be protective of public health under certain circumstances to wait on analytical results. When an extreme weather event, such as a hurricane, tropical storm, or torrential rain occurs, a preemptive advisory may be issued without current sampling data. Preemptive rainfall advisories are issued at specific sites on Tier 1 beaches following rainfall due to high enterococcus counts routinely occurring in these areas following rainfall events. DHEC continues to work on creating a predictive model to refine the preemptive rainfall advisory issuance process.

Permanent Precautionary Warnings

Permanent precautionary warnings are issued at specific swashes and storm water outfalls based on continuous poor water quality in these areas, especially following rainfall. Permanent signs are posted at these sites warning that swimming or playing in runoff is not recommended. This general warning is also included in water quality advisories for affected beaches and in the beach description on the Earth 911 website.

Procedure for Issuing Advisories

In the event of an advisory, the responsible district staff member contacts the appropriate municipality. DHEC or the municipality post signs at conspicuous areas on the affected beach. Beach advisory signs include a statement that explains that swimming is not advised due to high bacteria levels in the water, but that wading, fishing, and shell collecting do not pose a risk and list contact information (see Attachment 2). Local media outlets are contacted by the district program manager or the municipality, as previously negotiated. A copy of the advisory is sent by electronic mail to the program coordinator and each coastal district office (Waccamaw, Low Country, Trident). The advisory includes as a minimum:

- date issued
- the location of the advisory ex: 200 feet above and below 16th Avenue North
- percentage of the total beach affected by this advisory
- reason for the advisory (if known) ex: heavy rainfall or sewer line break
- text of the advisory: A Swimming Advisory Has Been Issued By (local jurisdiction) and The SC Department of Health and Environmental Control for This Section of Beach. High Bacteria Levels Have Been Detected In This Section of The Beach, and Swimming Is NOT Advised Until Bacteria Levels Return to Normal

- district contact number

DHEC also maintains a web site that is useful for communicating information to residents, tourists and other agencies. This website contains program information, frequently asked questions, and program contact information (www.scdhec.net/water/html/beachmon.html). The web site also features a link to the Earth 911 Beach Water Quality website. The Earth 911 website (www.earth911.org) is updated by DHEC staff upon receipt of water quality results. Sample sites under advisement show up as red on the website, areas not under advisement are green. The website also offers a printable beach status report.

Procedure for Removing Advisories or Warnings

An advisory is removed when sample results confirm that enterococci levels are within acceptable limits (<104/100mL for Tier 1 and 2, <500/100mL for Tier 3). The municipality is notified of the sample results, the website is updated by DHEC staff, the signs are removed, and media outlets are contacted by either DHEC staff or the municipality.

Evaluation of the Notification Program's Effectiveness

The notification program will be continuously evaluated to ensure that the needs of the public and the objectives of DHEC are fulfilled. Members of the community may visit the DHEC beach monitoring website and send electronic mail with comments and suggestions or contact the central office or local district office. Periodic meetings with the coastal district office staff will be used to evaluate implementation of this plan and refine it as necessary.

To improve notification efforts for 2004, contracts for beach grants given to municipalities included specific requirements for the number of signs and sign placement in the event of an advisory. The contracts also specify that sign posting and removal must occur within four hours of notification.

OCEAN WATER QUALITY SAMPLING DATA FORM

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

CHARGE CODE: _____ COUNTY: _____ SHEET NO: _____

DATE OF SAMPLING: ____/____/____ (month / day / year) COLLECTOR: _____ CALL NO: _____

STATION NUMBER	LIMS SAMPLE ID#	TIME (MIL)	WEATHER (00041)	TIDE (00067)	CURRENT DIRECTION	RAINFALL (24 HOUR)	LAB SAMPLE #	ETCOC (50589)	SALINITY (00480)	OTHER ( )

Samples Released To: By: Date: Time:

Samples Analyzed By: Date Analyzed: Time Analyzed:

Samples Read By: Date Read: Time Read:

Data Released By: Release Date: **Comments:**

Weather	Wind/Current			Tides	
00 – Clear	001 – Calm	090 – East	270 – West	2000 – Ebb	4000 - Flood
01 – Fair	068 – Variable	135 – SE	315 – NW	2100 – ¼ Flood	4100 – ¼ Ebb
02 – Cloud	000 – North	180 – South		2200 – ½ Flood	4200 – ½ Ebb
22 – Rain	045 - NE	225 – SW		2300 – ¾ Flood	4300 – ¾ Ebb

DHEC 2508 (08/2002)

APPENDIX G
Public Evaluation of Program

Three public meetings were held concerning the beach monitoring work plan. These meeting were held in Beaufort, Charleston, and Myrtle Beach. The meeting announcements were placed on several areas of the agency's website and issued to coastal county newspapers through a press release. An invitation letter was also sent to each coastal government. At each meeting, South Carolina's beach evaluation and classification process, sampling design and monitoring plan, and public notification and risk communication plan were presented. Comments were received and incorporated into the respective sections.

Attachment 1
Bathing Beaches and Public Access Points
Rank, Sample Locations, and Positional Data

Tier 1 Beaches

City of North Myrtle Beach

Station	*Description*	*Longitude*	*Latitude*
WAC-001	59th Ave N	-78.6081281	33.8381116
WAC-002	45th Ave N	-78.6233836	33.8336687
WAC-003	30th Ave N	-78.6372373	33.8288522
WAC-004	16th Ave N	-78.6533888	33.8241275
WAC-005	3rd Ave N	-78.6681812	33.8188902
WAC-005A	7th Ave S	-78.6818196	33.8139202
WAC-006	9th Ave S	-78.6841137	33.8131406
WAC-007	17th Ave S	-78.7000859	33.8065623
WAC-008	33rd Ave S	-78.7176586	33.7985193
WAC-009	47th Ave S	-78.7316984	33.7916396

Town of Atlantic Beach

* beach is 0.27 miles long, there are no sampling sites on this beach because there are sites directly above and below it

White Point Swash – Horry County Beach

Station	*Description*	*Longitude*	*Latitude*

Town of Briarcliffe Acres

Station	*Description*	*Longitude*	*Latitude*
WAC-009A	White Point Swash	-78.7399968	33.7867313
WAC-010	Briarcliff Cabana	-78.7418836	33.7863648
WAC-011	2m N Of Wyndham Hotel	-78.7456588	33.7844389

Arcadia Beach – Horry County Beach

Station	*Description*	*Longitude*	*Latitude*
WAC-012	Lands End Resort Arcadia	-78.7644272	33.7738569
WAC-013	Wyndam Hotel Arcadia	-78.7751472	33.7679330
WAC-014	Sands Ocean Club Arcadia	-78.7884552	33.7593629
WAC-015	Singleton Swash Arcadia	-78.7949680	33.7554580

City of Myrtle Beach

Station	*Description*	*Longitude*	*Latitude*
WAC-016	77th Ave North Mb	-78.8128891	33.7432032
WAC-016A	Cane Patch Swash Mb	-78.8222535	33.7369623

WAC-017	64th Ave North Mb	-78.8259239	33.7342228
WAC-017A	Deep Head Swash Mb	-78.8380851	33.7249800
WAC-018	50th Ave North Mb	-78.8426859	33.7217018
WAC-019	34th Ave North Mb	-78.8571075	33.7103910
WAC-020	24th Ave North Mb	-78.8662608	33.7028987
WAC-021	8th Ave North Mb	-78.8800091	33.6904148
WAC-022A	Withers Swash	-78.8907427	33.6800915
WAC-024	23rd Ave South Mb	-78.9078527	33.6664849
WAC-025A	Midway Swash	-78.9170543	33.6581395

Springmaid Beach – Horry County Beach

Station	*Description*	*Longitude*	*Latitude*
WAC-026	Nash Drive Mb	-78.9210152	33.6548022

South Carolina State Park and Campgrounds – Horry County Beach

Station	*Description*	*Longitude*	*Latitude*
WAC-027	Myrtle Beach State Park	-78.9322370	33.6453918
WAC-028	Pirateland Swash	-78.9448891	33.6331050
WAC-029	Ocean Lakes Cg	-78.9522428	33.6256796
WAC-029A	Ocean Lakes Discharge	-78.9584233	33.6190057

Town of Surfside Beach

Station	*Description*	*Longitude*	*Latitude*
WAC-030	16th Ave N	-78.9611507	33.6161130
WAC-031	11th Ave N Surfside	-78.9641393	33.6131460
WAC-031A	5th Ave N Swash	-78.9678983	33.6087667
WAC-032	3rd Ave N Surfside	-78.9691373	33.6077479
WAC-033	3rd Ave S Surfside	-78.9740541	33.6027406
WAC-034	8th Ave S Surfside	-78.9771679	33.5993875
WAC-035	13th Ave S Surfside	-78.9810281	33.5952913

Tier 2 Beaches

Garden City Beach – Horry County Beach

Station	*Description*	*Longitude*	*Latitude*
WAC-036	Hawes Ave Gc	-78.9875519	33.5881838
WAC-037	Azalea Ave Gc	-78.9987463	33.5759710

Garden City Beach – Georgetown County Beach

Station	*Description*	*Longitude*	*Latitude*
WAC-038	Gc Point	-79.0280417	33.5343343

Huntington Beach State Park – Georgetown County Beach

Station	*Description*	*Longitude*	*Latitude*

WAC-039	North Access Hb State Pa	-79.0485453	33.5144847
WAC-040	Visitors Center Hb State	-79.0650630	33.5015691

Litchfield Beach – Georgetown County Beach

Station	*Description*	*Longitude*	*Latitude*
WAC-041	Songbird Ln Lb	-79.0826594	33.4852593
WAC-042	Litchfield Inn	-79.0956795	33.4691087
WAC-043A	1st L Past Gate	-79.1006280	33.4618510

Town of Pawleys Island

Station	*Description*	*Longitude*	*Latitude*
WAC-044A	Pub Access 2nd/atlantic	-79.1189178	33.4324118
WAC-045A	Public Access Springs/ha	-79.1308041	33.4120827
WAC-046	Pawleys Is. South Parkin	-79.1381272	33.3996241

Debordieu Beach – Georgetown County Beach

Station	*Description*	*Longitude*	*Latitude*
WAC-047	Luvan Way	-79.1485221	33.3750841
WAC-048	Lafayette/ocean Green Bl	-79.1516853	33.3597849

Isle of Palms

Station	*Description*	*Longitude*	*Latitude*
TRI-050	Port O Call	-79.7209687	32.8103981
TRI-051	Dunes Crest	-79.7295831	32.8041945
TRI-052	Iop 53 Ave	-79.7451271	32.7993724
TRI-053	34th Ave Iop	-79.7655512	32.7935276
TRI-054	21st Ave Iop	-79.7816777	32.7867809
TRI-054B	IOP County Park	-79.7848167	32.7855333
TRI-055	Iop 7th Ave	-79.7949164	32.7811633
TRI-056	Iop 4th Ave	-79.8016763	32.7773541

Sullivans Island

Station	*Description*	*Longitude*	*Latitude*
TRI-057	Sta 30	-79.8166954	32.7681455
TRI-058	Sta 26	-79.8256178	32.7625199
TRI-059	Sta 18 Half	-79.8418775	32.7561453

Folly Beach

Station	*Description*	*Longitude*	*Latitude*
TRI-060	1731 E Ashley	-79.8919986	32.6798872
TRI-061	1561 E Ashley	-79.9050167	32.6708123
TRI-062	11th Ave	-79.9177666	32.6634835
TRI-063	4th Ave	-79.9332694	32.6570540
TRI-064	Center St	-79.9385997	32.6545036

TRI-065	3rd Ave	-79.9445986	32.6524209
TRI-066	8th Ave	-79.9550550	32.6472203
TRI-067	Folly Park	-79.9591553	32.6449023

Kiawah Island

Station	*Description*	*Longitude*	*Latitude*
TRI-068	Ocean Marsh	-80.0446670	32.6082198
TRI-069	Surfsong	-80.0706165	32.6040103
TRI-070	Seaforest Dr	-80.1012961	32.5971705
TRI-071	Shipwatch	-80.1172482	32.5916751
TRI-072	Duneside	-80.1267146	32.5873798

Seabrook Island

Station	*Description*	*Longitude*	*Latitude*
TRI-073	Oyster Catcher	-80.1570319	32.5654819
TRI-074	St Christ Camp	-80.1823011	32.5650084

Edisto Island

Station	*Description*	*Longitude*	*Latitude*
LC-075	Edingsville (Jeremy Cay)	-80.2741667	32.5187500
LC-076	Jeremy Inlet	-80.2888036	32.5091141
LC-077	Pavilion	-80.2961892	32.5030440
LC-077A	Matilda St	-80.3056000	32.4968167
LC-077B	Atlantic St	-80.3098333	32.4938000
LC-078	Cheehaw	-80.3147337	32.4899083
LC-079	Edings	-80.3254256	32.4825645
LC-080	Edisto St	-80.3376307	32.4783173
LC-080A	Mikell St	-80.3412500	32.4821833
LC-081	Ebb Tide	-80.3439132	32.4891121
LC-082	Bay Point	-80.3460287	32.4953520

Harbor Island

Station	*Description*	*Longitude*	*Latitude*
LC-083	N Harbor Dr	-80.4403469	32.4129153
LC-084	Bt Lots 118 120	-80.4355128	32.4124585
LC-085	Bt Lots54 56	-80.4319043	32.4091789

Hunting Island

Station	*Description*	*Longitude*	*Latitude*
LC-086	Camps 73 75	-80.4305767	32.3883794
LC-087	Camps 47 49	-80.4318066	32.3848848
LC-088	South Beach Cons	-80.4409419	32.3648875
LC-089	Cabin 9	-80.4521517	32.3406450
LC-090	N Beach Restroom	-80.4369093	32.3730697

LC-091	Lighthouse	-80.4360518	32.3750618

Fripp Island

Station	*Description*	*Longitude*	*Latitude*
LC-092	Access 25	-80.4899288	32.3104403
LC-093	Fripp Villas	-80.4803966	32.3144317
LC-094	Seahorse	-80.4712075	32.3163850
LC-095	Red Drum Rd	-80.4673595	32.3173408
LC-096	Marlin Dr Access 2	-80.4624500	32.3193000

Hilton Head Island

Station	*Description*	*Longitude*	*Latitude*
LC-098	Port Royal Plantation	-80.6685909	32.2197216
LC-099	Folly Field	-80.6882693	32.2006913
LC-100	Burks Beach	-80.6962256	32.1928845
LC-101	Moorings	-80.7148049	32.1678615
LC-102	Hilton	-80.7200065	32.1618016
LC-103	Ocean Woods	-80.7310570	32.1516425
LC-104	Sea Crest	-80.7480456	32.1415282
LC-105	Elderberry	-80.7658163	32.1335377
LC-106	Marriot	-80.7627161	32.1349257
LC-107	Sea Pines Beach Club	-80.7856603	32.1241791
LC-108	Atlantic Pointe	-80.8008067	32.1164881
LC-109	Tower Beach	-80.8228073	32.1075284
LC-110	Beachside Tennis	-80.8283337	32.1122093
LC-111	Landsend Drive	-80.8260547	32.1209233

Tier 3 Beaches and Points of Access

Beaches

*Sampling sites are yet to be determined

Description	*Longitude*	*Latitude*
Waites Island	-78.5801884	33.8453485
Baruch Property	-79.1530609	33.3425263
North Island	-79.1779858	33.2581613
South Island	-79.2241388	33.1482962
Cedar Island	-79.2586208	33.1223898
Murphy Island	-79.3144978	33.0985506
Bulls Island	-79.6149986	32.8952539
Capers Island	-79.6771458	32.8607976
Dewees Island	-79.7100237	32.8313701
Morris Island	-79.8836626	32.7068062
Eddingsville Beach	-80.2570239	32.5265630

ACE Basin Island	-80.3897651	32.4732852
Dafuskie Island	-80.8654632	32.0895814
Turtle Island	-80.8981410	32.0612238
Port Royal Sound	-80.6913944	32.2469260
Parris Island	-80.6695328	32.2980569
Bay Point	-80.6330081	32.2560704
Cape Romain	-79.4615410	33.0068228

Marinas

NAME	*COUNTY*	*LONGITUDE*	*LATITUDE*
BATTERY CREEK MARINA	BEAUFORT	-80.7163999	32.3773766
BEAUFORT DOWNTOWN	BEAUFORT	-80.6739815	32.4305180
BROAD CREEK MARINA	BEAUFORT	-80.7563762	32.1841127
DATAW ISLAND MARINA	BEAUFORT	-80.5738290	32.4519981
DOWNTOWN BEAUFORT MARINA	BEAUFORT	-80.6739815	32.4305180
FREEPORT MARINA	BEAUFORT	-80.8713050	32.1326153
FRIPP ISLAND MARINA	BEAUFORT	-80.4888580	32.3229326
HARBOR TOWN MARINA	BEAUFORT	-80.8119334	32.1378570
HILTON HEAD MARINA	BEAUFORT	-80.7563762	32.1841127
LADIES ISLAND MARINA	BEAUFORT	-80.6578367	32.4190409
MARSH HARBOR BOATYARD	BEAUFORT	-80.6595804	32.4471509
MELROSE LANDING	BEAUFORT	-80.8727535	32.1314191
OUTDOOR RESORTS MARINA	BEAUFORT	-80.7724488	32.2230929
PALMETTO BAY MARINA	BEAUFORT	-80.7734899	32.1779625
PORT ROYAL LANDING	BEAUFORT	-80.6794671	32.3954803
SCHILLINGS BOATHOUSE	BEAUFORT	-80.7481619	32.2365114
SHELTER COVE MARINA	BEAUFORT	-80.7309770	32.1820088
SKULL CREEK MARINA	BEAUFORT	-80.7467004	32.2458479
SOUTH BEACH MARINA	BEAUFORT	-80.8244169	32.1200617
WEXFORD LOCK HARBOR	BEAUFORT	-80.7620824	32.1759681
WINDMILL HARBOR MARINA	BEAUFORT	-80.7820741	32.2174241
DANIEL ISLAND MARINA VILLAGE	BERKELEY	-79.9364308	32.8903779
HALSEY-CANNON BOAT YARD	BERKELEY	-79.8321797	32.9270712
ADAMS CREEK	CHARLESTON	-80.2014997	32.6071092
ASHLEY MARINA	CHARLESTON	-79.9562755	32.7816196
BOHICKET MARINA	CHARLESTON	-80.1566536	32.6058261
BUZZARDS ROOST MARINA	CHARLESTON	-80.0126590	32.7533814
CHARLESTON CITY MARINA	CHARLESTON	-79.9528181	32.7789276
CHARLESTON HARBOR MARINA	CHARLESTON	-79.9085430	32.7870871
CHARLESTON MARITIME CTR.	CHARLESTON	-79.9250335	32.7890044
COOPER RIVER MARINA	CHARLESTON	-79.9351748	32.8316609
DOLPHIN COVE MARINA	CHARLESTON	-79.9653527	32.8305114
DUNCANS BOAT HARBOR	CHARLESTON	-80.0224532	32.8364975
FOLLY BEACH MARINA/CAMPGROUND	CHARLESTON	-79.9614850	32.6480630
ISLE OF PALMS MARINA	CHARLESTON	-79.8110676	32.7772993
LELAND MARINE	CHARLESTON	-79.4623757	33.0830502

LONG ISLAND YACHT HARBOR	CHARLESTON	-79.8097409	32.7781007
MARINERS CAY MARINA	CHARLESTON	-79.9481930	32.6614285
RIPLEYS LIGHT MARINA	CHARLESTON	-79.9615109	32.7774372
ROSS MARINE	CHARLESTON	-80.0640424	32.7712456
SHEM CREEK MARINA	CHARLESTON	-79.8773337	32.7929493
STONO MARINA	CHARLESTON	-80.0124031	32.7520264
TOLERS COVE MARINA	CHARLESTON	-79.8465654	32.7751034
WILD DUNES YACHT HARBOR	CHARLESTON	-79.7596620	32.8054838
EDISTO MARINA	COLLETON	-80.3395867	32.4933789
EDISTO WATER SPORTS & TACKLE	COLLETON	-80.3346564	32.4922975
BELLE ISLAND MARINA	GEORGETOWN	-79.2935391	33.3040044
CAPTIAN DICKS MARINA	GEORGETOWN	-79.0311873	33.5566441
EXXON MARINA	GEORGETOWN	-79.2802510	33.3614750
GEORGETOWN LANDING MARINA	GEORGETOWN	-79.2679093	33.3659928
HARBOR WALK MARINA	GEORGETOWN	-79.2828547	33.3646426
MARLIN QUAY MARINA	GEORGETOWN	-79.0199071	33.5522822
THE BOAT SHED (AKA EXXON)	GEORGETOWN	-79.2802510	33.3614750
VOYAGERS VIEW	GEORGETOWN	-79.0328822	33.5554289
ANCHOR MARINA	HORRY	-78.6514695	33.8531819
COQUINA HARBOR	HORRY	-78.6381252	33.8617018
CRICKETT COVE MARINA	HORRY	-78.6225221	33.8659007
HARBOURGATE MARINA VILLAGE	HORRY	-78.6543949	33.8509069
MARINA AT DOCK HOLLIDAY'S	HORRY	-78.6676798	33.8408016
MARINERS POINT	HORRY	-78.6179921	33.8685293
NORTH MYRTLE BEACH MARINA	HORRY	-78.6455067	33.8576708
SPINNAKER COVE MARINA	HORRY	-78.6291599	33.8620818

Other Points of Public Access

Permit	*Applicant Name*	*Type*	*Longitude*	*Latitude*
00-1A-464-P	SC SPA GEORGETOWN TERMINAL	PEIR 31 EXTENSION	-79.2863411	33.3603169
00-1B-562-P	TRITON GC, LLC	COMMUNITY DOCK	-79.8734341	32.8520601
00-1B-574-P	SEWEE PRESERVE, LLC	COMMUNITY DOCK	-79.7235284	32.8892042
00-1D-039	BEAUFORT COUNTY	BOAT RAMP	-80.7741563	32.1780720
00-1E-003-P	SCDNR	JESSEN LANDING PIER	-80.1648027	32.9475245
00-1E-036-P	B & A CROSSWINDS, LLC	COMMUNITY PIER	-80.7281039	32.1952959
00-1E-160-P	HOPE PLANTATION POA	COMMUNITY DOCK	-80.1307120	32.6187155
00-1E-216-P	PLANTATION PARTNERS, LP	COMMUNITY DOCK #1	-79.8725079	32.8556394
00-1E-217-P	PLANTATION PARTNERS, LP	COMMUNITY DOCK #2	-79.8724808	32.8540855
00-1E-218-P	PLANTATION PARTNERS, LP	COMMUNITY DOCK #3	-79.8725316	32.8528682
00-1E-219-P	PLANTATION PARTNERS, LP	COMMUNITY DOCK #4	-79.8713584	32.8511056
00-1E-301-P	THE RETREAT AT ETIWAN POINT	COMMUNITY DOCK	-79.8838446	32.8548729
00-1E-301-P	THE RETREAT AT ETIWAN POINT	COMMUNITY DOCK	-79.8829876	32.8544526
00-1E-372-P	HABERSHAM LAND CO., INC	COMMUNITY BOAT RAMP	-80.7778845	32.4177580
00-1E-382-P	W.H. ADELHART	COMMUNITY DOCK	-80.1515926	32.6439037
00-1E-594-P	CRYSTAL BEACH DOCK ASSOC.	COMMUNITY DOCK	-80.8555581	32.2131698
00-1E-608-P	BAY POINTE VILLAS HORIZ.	COMMUNITY DOCK	-80.1668287	32.5967404

	PROP. REGIM			
00-1L-497	COOPER WELLONS	COMMUNITY DOCK 1	-79.0206420	33.5704912
00-1L-498	COOPER WELLONS	COMMUNITY DOCK 2	-79.0208271	33.5703161
00-1L-499	COOPER WELLONS	COMMUNITY DOCK 3	-79.0209367	33.5701172
00-1L-500	COOPER WELLONS	COMMUNITY DOCK 4	-79.0210167	33.5699156
00-1L-591-C	POINT COMFORT POA	RENOVATE BOAT RAMP	-80.7875778	32.1582997
00-1P-226-P	R.E.R. INVESTMENTS	REPLACE DOCK/PIER	-79.9257016	32.7918289
00-1P-319-P	CITY OF CHARLESTON	PUBLIC DOCK	-79.9021543	32.8560970
00-1P-525-P	SALMONS DREDGING CORPORATION	REPAIR PIER/DOCK	-79.9426979	32.8329943
00-1W-513-P	DISTANT ISLAND COMPANY, LP	BOAT RAMP	-80.6398557	32.3872972
00-1Z-314-P	CITY MARINA COMPANY, INC	MARINA	-79.9586602	32.7852092
2000-1E-015-P	CITY OF BEAUFORT	PIER	-80.6703561	32.4523013
2000-1H-572-P	R.H.T. INVESTMENTS	COMMUNITY DOCK	-80.1282778	32.9096208
2001-1B-108-P	WINSTON CARLYLE & CO	COMMUNITY DOCK	-80.0365009	32.7543472
2001-1B-215-P	TOWN OF HILTON HEAD ISLAND	BOAT RAMP/PIER	-80.7696780	32.1770941
2001-1D-269-P	SOUTH BEACH MARINA, LLC	JET SKI DOCK	-80.8248770	32.1160928
2001-1E-087-P	KIAWAH RESORT ASSOCIATES, LP	COMMUNITY DOCK	-80.0287108	32.6274191
2001-1E-160-P	SUMMERTIDE, INC (REVISED)	DECK & PIER	-79.2834449	33.3658863
2001-1E-160-P	SUMMERTIDE, INC	DECK, WALKWAY, PIER	-79.2834277	33.3659018
2001-1E-161-P	DELL WEBB COMMUNITIES, INC	COMMUNITY DOCK	-80.9247426	32.3100322
2001-1E-193-P	TOWN OF MT. PLEASANT	PIER EXTENSION	-79.8623008	32.7696256
2001-1E-195-P	WHITEHALL PLANTATION, LLC	COMMUNITY DOCK	-79.2940629	33.3092309
2001-1E-249-P	HARRY HUFFMAN	COMMUNITY BOATRAMP	-80.0365570	32.7774438
2001-1E-256-P	HARRY HUFFMAN	COMMUNITY DOCK	-80.0358835	32.7757925
2001-1E-257-P	HARRY HUFFMAN	COMMUNITY DOCK	-80.0356182	32.7809658
2001-1G-170-P	SEACREST INVESTMENTS, LTD	BULKHEAD/BOAT RAMP/D	-79.9545789	32.8544850
2001-1H-315-P	RIPLEY LIGHT DEVELOPMENT, LLC	MARINA	-79.9628835	32.7779086
2001-1U-069-P	PAM McCONNELL	COMMUNITY DOCK	-79.5387156	33.0505460
2002-1E-019-P	OLDFIELD, LLC	COMMUNITY DOCK	-80.9035538	32.3279028
2002-1E-020-P	OLDFIELD, LLC	COMMUNITY DOCK	-80.9030139	32.3285362
2002-1E-099-P	HEAVEY, EDWARD T.	COMMUNITY DOCK	-79.9505817	32.7196138
2002-1E-132-P	JACOBS POINT	COMMUNITY DOCK	-80.1518551	32.7872768
2002-1E-195-P	ISLAND COMMUNITY POA	COMMUNITY DOCK	-80.7032514	32.4036996
2002-1E-227-P	NEWELL, MARK	COMMUNITY DOCK	-80.7354784	32.1931609
2002-1E-395-P	TOWN OF SULLIVAN'S ISLAND	PIER	-79.8399901	32.7641754
2002-1E-409-P	HEAVEY, EDWARD & DAWN	COMMUNITY DOCK	-79.8087492	32.9183782
2002-1E-523-P	RIVERSIDE @ ELLIS OAKS HOA, INC.	COMMUNITY DOCK	-79.9679852	32.7461838
2002-1H-022-P	JUPITER REALTY CORP	MARINA	-80.0250696	32.8388525
2002-1H-538-P	WHITEHALL PLANTATION, HOA	COMMUNITY ACCESS WAL	-79.2937613	33.3032564
2002-1L-114-P	BEAUFORT COUNTY GOVERNMENT	RECON. BOAT RAMP/FLO	-80.7843479	32.5034243
2002-1L-233-P	BEAUFORT COUNTY GOVERNMENT	REPAIR BOAT RAMP / D	-80.5999468	32.4849251

2002-1N-221	GRAYSON, RICHARD M.	COMMUNITY DOCK/BOATL	-80.7132628	32.5271017
2002-1Z-560-P	GEORGETOWN COUNTY	PIER	-79.0500455	33.5387968
80	POPE@ DANIEL T.	PUBLIC BOAT RAMP	-80.2838614	32.5594000
81	CONNALLY@ R.H.	PUBLIC BOAT RAMP	-80.0355491	32.8430689
82	SEEL@ ALBERT	PUBLIC BOAT RAMP	-80.0458179	32.7774091
82	BRUNSON@ M.R.	PUBLIC BOAT RAMP	-80.0547173	32.8540845
82	WRAY@ ROBERT O.	PUBLIC BOAT RAMP	-80.1436185	32.6517859
84	HORLBECK@ A LIMITED PARTNERSHIP	PUBLIC BOAT RAMP	-79.8090531	32.8693164
84	SUMMERSETT@ HELEN & ROBERT	PUBLIC BOAT RAMP	-80.3439941	32.5944559
84	LYONS@ DON & BURLEY	PUBLIC BOAT RAMP	-80.3163757	32.5002560
84	FLOWERS@ STEVE W. JR.	PUBLIC BOAT RAMP	-80.2921460	32.5108410
84	VAN WIE@ GEOFFREY W.	PUBLIC BOAT RAMP	-79.0260728	33.5374421
85	BENDER@ ROBERT R.	PUBLIC BOAT RAMP	-80.8287881	32.3973627
85	TIMBER@ CHARLES A. JR.	PUBLIC BOAT RAMP	-80.3043456	32.5597993
85	BEAUFORT COUNTY PUBLIC WORKS	PUBLIC BOAT RAMP	-80.6697274	32.5755726
85	NEILSON@ROBERT R. JR.	PUBLIC BOAT RAMP	-79.5903673	33.0140871
85	COOPER RIVER LANDING@ INC.	PUBLIC BOAT RAMP	-80.8698433	32.1317538
85	SCHILLING PROPERTIES@ INC.	PUBLIC MARINA	-80.7485422	32.2338026
86	HANTSKE@ WILLIAM G.@ JR.	PUBLIC BOAT RAMP	-79.9614607	32.7380577
86	PERKINS@ ANDREW C.	PUBLIC BOAT RAMP	-79.9603701	32.7341204
86	GIANARIS@ TED N. AND JOYCE P.	PUBLIC BOAT RAMP	-79.9612798	32.7327592
86	VICKERS@ CHARLES B.	PUBLIC BOAT RAMP	-79.9098493	32.7261076
86	CREEKSIDE COMMON PROPERTY@. INCORPO	PUBLIC BOAT RAMP	-79.8565002	32.8328861
86	BARNETT@ DR. L. THOMAS	PUBLIC BOAT RAMP	-79.0116162	33.5621168
86	BARRINEAU@ THOMAS B.@ JR.	PUBLIC BOAT RAMP	-79.0275471	33.5398823
86	TAYLOR@ THELMA B.	PUBLIC BOAT RAMP	-79.5512375	33.0426965
86	BEAUFORT COUNTY PUBLIC WORKS	PUBLIC BOAT RAMP	-80.6288047	32.3882406
86	HARRISON@ MARY T. AND EDWARD@ III	PUBLIC BOAT RAMP	-80.3051969	32.6867241
86	SCURRY@ WILLIAM P.	PUBLIC MARINA	-80.7720248	32.1815002
87	GARRIS@ O. HOLLIS	PUBLIC BOAT RAMP	-79.9578775	32.7388714
87	HAYNSWORTH@ G. EDWARD	PUBLIC BOAT RAMP	-80.1259154	32.6630364
87	HUNT@ WILL@	PUBLIC BOAT RAMP	-80.5365927	32.4056189
88	BEAUFORT COUNTY PUBLIC WORKS	PUBLIC BOAT RAMP	-80.5493946	32.4364498
88	BEAUFORT COUNTY PUBLIC WORKS	PUBLIC BOAT RAMP	-80.5511486	32.4350736
88	MONSON@ ERIC AND CAROLYN	PUBLIC BOAT RAMP	-80.7322967	32.5253686
88	TANG INVESTMENT ASSOCIATES	PUBLIC MARINA	-80.3841865	32.5784964
95-1W-413-P	THE CUSABO CO.	COMMUNITY DOCK	-80.6188013	32.4781635
95-1W-417-P	KIAWAH RESORTS ASSOC.	COMMUNITY DOCK	-80.0507941	32.6140393
96-1A-119-P	THE FRIPP COMPANY	COMMUNITY DOCK	-80.4994585	32.3062656
96-1B-029-P	KEITH TOOMER	COMMERCIAL DOCK	-80.7585088	32.2163438

96-1B-043-P	SC DEPT. NATURAL RESOURCES	PUBLIC BOAT RAMP	-81.0007669	32.1959220
96-1B-307-P	CHARLESTON YACHT CLUB	PIER	-79.9536070	32.7801181
96-1D-068-P	CHARLESTON COUNTY PARKS & REC	REPAIR BOAT RAMP	-79.9972364	32.6680246
96-1D-069-P	CHAS. CO. P.R.C.	REPAIR BOAT RAMP	-80.2964605	32.6885241
96-1D-096-P	CHARLESTON COUNTY PARKS/RECREATION	UPGRADE BOAT RAMP	-79.9926497	32.7678799
96-1D-097-P	CHARLESTON COUNTY PARKS\RECREATION	UPGRADE BOAT RAMP	-80.1830113	32.5977781
96-1D-137-P	CHAS CO PARKS & REC COMM	REPAIR BOAT RAMP	-79.8770422	32.7928858
96-1D-312-P	CHARLESTON COUNTY PRC	REPAIR BOAT RAMP	-79.9731181	32.7671981
96-1D-325-P	CITY OF BEAUFORT	REPAIR BOAT RAMP	-80.6702368	32.4514688
96-1E-156-P	FULLER STREET CORP.	COMM DOCK, BOAT RAMP	-80.3717999	32.5555215
96-1E-383-P	KIAWAH RESORTS ASSOC.	COMMUNITY DOCK	-80.0314243	32.6204989
96-1E-430-P	BORDELEAUX CONDOMINIUMS	COMMUNITY DOCK	-79.9669487	32.8017146
96-1G-401-P	HOMEOWNERS ASSOC OF THE POINTE	ADDTO COMMUNITY DOCK	-80.0348165	32.7680562
96-1G-424-P	CHAS. COUNTY PARK & REC. COMM.	FLOATS, BOAT RAMP	-80.1065934	32.7849310
96-1T-205-P	JIM TIMMS	COMMUNITY DOCK	-80.3391310	32.4927451
96-1T-248-P	GULF STREAM CAPITAL ASSOC.	MARINA	-79.9075759	32.7855565
96-1W-160-P	USC-BEAU, PRITCHARDS ISLAND	COMMUNTIY DOCK	-80.5070758	32.3080186
96-1W-228-P	TOWN OF JAMES ISLAND	COMMUNITY DOCK	-79.9604896	32.7441085
96-1W-363-P	SPRING ISLAND COMMUNITY	BOAT RAMP	-80.8388410	32.3446139
96-1W-394-P	CHAS. CO. PARKS & REC.	REPAIR BOAT RAMP	-80.3410913	32.6357613
97-1B-121-P	CANN-HAL	MARINA	-79.8321443	32.9276752
97-1D-052-P	S.C.D.N.R.	REPAIR BOAT RAMP	-80.5544292	32.5677670
97-1D-073-P	SCDNR	PUBLIC DOCK	-80.4539790	32.5586927
97-1D-098-P	THE HAMMOCKS POA	FILL,BOAT RAMP,DOCK	-80.2889013	32.5138663
97-1D-389-P	S.C. DEPART. OF NATURAL RESOURCES	BOAT RAMP REPAIRS	-79.0387043	33.5512875
97-1D-444-P	S.C. DEPARTMENT OF NATURAL RESOURCE	REPAIR BOAT RAMP	-80.8082933	32.2891170
97-1E-015-P	RIVERTOWNE L. P.	COMMUNITY DOCK	-79.8347240	32.9046178
97-1E-019-P	KIAWAH RESORTS ASSOC.	BOAT RAMP, FLOAT	-80.0290852	32.6248377
97-1E-226-P	RIVER BLUFF, L. P.	COMMUNITY DOCK	-80.6804370	32.3949889
97-1E-255-P	PALMETTO PLANTATION	COMMUNITY DOCK	-80.1243840	32.9047385
97-1E-281-P	DARRELL CREEK PLANTATION LLC	COMMUNITY DOCK	-79.7693297	32.9136264
97-1E-319-P	BRYAN HOMES, INC.	COMMUNITY DOCK	-80.7548933	32.2282610
97-1E-327-P	METAL TRADES, INC.	ADD TO PIERS	-79.9366172	32.8500852
97-1E-335-P	T & T DEVELOPMENT CO., INC.	COMM.DOCK, BOAT RAMP	-79.8083494	32.8748566
97-1E-367-P	TONY PORTER	COMMUNITY DOCK	-80.7361363	32.3938593
97-1E-452-P	BERESFORD POINTE LLC	COMM DOCK, BOAT RAMP	-79.9263901	32.8647770
97-1G-100-P	INLET COVE HOA	ADD COMM DOCK	-80.1304855	32.5941736
97-1G-278-P	SPRING ILSAND COMPANY	SIX COMMUNITY DOCKS	-80.8401306	32.3424775
97-1G-279-P	INLET POINT HOA	COMMUNITY DOCK	-79.1027352	33.4626633

97-1T-425-P	RIPLEY POINT ASSOCIATES	PUBLIC DOCK, RIP RAP	-79.9635911	32.7774319
97-1W-413-P	FRED TRASK	COMMUNITY DOCK	-80.6680923	32.3742984
98-1A-264-P	GARDEN CITY COMMUNITY ASSOCIATION	COMMUNITY DOCK	-79.0011029	33.5811986
98-1D-066-CPW	S.C.D.N.R.	REPAIR BOAT RAMP	-78.6544713	33.8521143
98-1D-071-P	BEAUFORT COUNTY COUNCIL	REPAIR BOAT RAMP	-80.7199579	32.3775411
98-1D-172-P	BEAUFORT COUNTY	EXPAND PUBLIC RAMP	-80.7880562	32.2264693
98-1D-398-P	HAROLD G. WORLEY	PUBLIC FISHING PIER	-78.6721352	33.8159625
98-1E-064-P	SCANA CORPORATION	ADD TO COMM. DOCK	-79.9349238	32.8232702
98-1E-148-P	WRIGHT'S POINT H.A.	2 COMMUNITY DOCKS	-80.7243897	32.3838071
98-1E-149-P	SELKIRK HOMEOWNERS ASSOCIATION	REPAIR COMMUNITY DOC	-80.1979173	32.6520966
98-1E-298-P	NEWPOINT RESIDENTS ASSOC.	ADD TO COMM. DOCK	-80.6480196	32.4309894
981E421-428-P	SOUTHERN LAND & GOLF COMPANY	1 COMM DOCK, 7 RES D	-78.6328386	33.8568172
98-1G-192-P	WEST BANK COMMUNITY	COMMUNITY DOCK	-80.2446446	32.5911908
98-1G-319-P	BLACK RIVER PROPERTIES	COMMUNITY DOCK	-79.1167953	33.4450270
98-1G-319-P	BLACK RIVER PROPERTIES	COMMUNITY DOCK	-79.1159642	33.4455961
98-1G-319-P	BLACK RIVER PROPERTIES	COMMUNITY DOCK	-79.1159771	33.4461170
98-1G-323-P	BYI, LLC	COMMUNITY DOCK	-80.0858265	32.7934789
98-1G-327-P	CITY OF NORTH CHARLESTON	2 PUB. DOCKS, BULKHE	-79.9721642	32.8899889
98-1P-415-P	BEAUFORT PROPERTIES, LLC	COMMUNITY DOCK	-80.6399117	32.3289074
98-1W-066-P	FRED TRASK	COMM DOCK & RAMP	-80.6732652	32.3691586
98-1W-099-P	PALM SHORES DEVELOPEMENT	COMM DOCK, BOAT RAMP	-79.0049423	33.5775995
99-1E-005-P	CAROLINA HERITAGE REAL ESTATE CO.	COMMUNITY DOCK	-80.0308437	32.8396521
99-1E-039-P	SPRING ISLAND COMPANY, L. P.	ADD TO COMMUNITY DOC	-80.8442651	32.3035105
99-1E-068-P	TANSI VILLAGE POA, INC.	COMMUNITY DOCK	-80.5698268	32.4194567
99-1E-162-P	PACES WATCH LIMITED PARTNERSHIP	COMMUNITY DOCK	-79.8662033	32.8019028
99-1E-358-P	SCDNR	FISHING PIER	-81.0009920	32.1942755
99-1E-365-P	HABERSHAM LAND CO, INC.	COMMUNITY DOCK	-80.7722449	32.4194710
99-1E-382-P	STORE CREEK TRUST	COMMUNITY DOCK	-80.3211292	32.5506236
99-1E-403-P	POLLY POINT PLANTATION POA	COMMUNITY DOCK	-80.2063639	32.6791126
99-1E-458-P	CHECHESSEE LAND & TIMBER CO	COMMUNITY DOCK	-80.8485945	32.3536180
99-1G-133-P	TILLY ISLAND, LLC	COMMUNITY DOCK	-80.5532007	32.6275121
99-1G-157-P	CITY OF NORTH CHARLESTON	BOAT RAMP, RIP RAP	-79.9715975	32.8895310
99-1G-322-P	THE I'ON COMPANY	BOAT RAMP, DOCK 1	-79.8776670	32.8229932
99-1G-385-P	CITY OF ISLE OF PALMS	PUBLIC BOAT RAMP	-79.8101845	32.7757620
99-1P-023-P	DOLPHIN POINT HOMEOWNERS ASSOCIATIO	PIER, REBUILD BOAT R	-80.6618437	32.3605448
99-1P-086-P	LAWRENCE O. THOMPSON	COMMUNITY DOCK	-79.9522458	32.7493978
99-1P-108-P	BROAD POINTE LIMITED PARTNERSHIP	COMMUNITY DOCK	-80.7396243	32.1881458
99-1P-152-P	LAURENS PLACE, LLC	MARINA	-79.9254508	32.7869379
99-1P-152-P(R	LAURENS PLACE, LLC	MARINA	-79.9246221	32.7878666
99-1-P-447-P	COOPER WELLONS	COMMUNITY RAMP	-79.0201031	33.5707103

99-1P-478-P	CAROLINA YACHT CLUB	BOAT RAMP, ADD TO DO	-79.9262460	32.7715227
99-1W-158-P	TEMPLETON & HUFF	COMMUNITY DOCK	-79.9381237	32.7065100
99-1W-364-P	TENNYSON HOA	COMMUNITY DOCK	-79.7935681	32.9031563
99-1W-366-P	BLAND & SONS	COMMUNITY DOCK	-80.6315565	32.2624684
99-1W-512-P	CITY OF CHAS. DEPT. OF PARKS	SUNRISE PARK PIER	-79.9181200	32.7548423
OCRM-00-1126	CITY OF BEAUFORT	PUBLIC DOCK	-80.6704221	32.4522564
OCRM-00-738-R	RIVERTOWNE LTD. PARTNERSHIP	MODIFY COMMUNITY DOC	-79.8380676	32.8999925
OCRM-01-164-E	SCALISE DEVELOPMENT, INC	MODIFY PIER	-78.9716837	33.6049989
OCRM-96-094-I	GARY SEELS	REWK COMM BOAT RAMP	-80.0289750	32.8270884
OCRM-96-151-I	NORTH MYRTLE BEACH MARINA	MARINA	-78.6455203	33.8573983
OCRM-96-419-I	HIDDEN COVE HOA	BOAT RAMP, RIP-RAP	-79.8706868	32.8259272
OCRM-97-145-I	REEL CRAZY CHARTERS/MARLIN QUAY MA.	ATF FINGER PIER	-79.0204104	33.5521731
OCRM-97-254-E	TLB LLC	BOAT RAMP	-80.2889890	32.6480202
OCRM-97-706-E	COBURG DAIRY, INC.	BOAT RAMP, RIP RAP	-79.9868606	32.7708797
OCRM-98-410-E	POINT COMFORT POA	ADD TO COMM. DOCK	-80.7876317	32.1570976
OCRM-98-418-I	COOPER ESTATES CIVIC CLUB	REPAIR BOAT RAMP	-79.8778482	32.7919459
OCRM-98-702-E	TANSI VILLAGE POA	COMMUNITY DOCK	-80.5698044	32.4195604
OCRM-99-275-I	OCEAN POINTE	COMMUNITY DOCK	-78.6067390	33.8389344